What is claimed is:

1. An acetabular liner for hip replacement comprising:

(a) an internal concave surface adapted to receive the head of a femoral component;

(b) an external surface positioned on an opposing side of the liner from the internal concave surface;

(c) a sculpted surface generally defining at least part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner; and

(d) wherein the sculpted surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the shape of the sculpted surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component that is in an impingement condition with the liner.

2. A liner according to claim 1, wherein the reference line is an axis of the liner.

3. A liner according to claim 2, wherein the axis of the liner is the center axis of the internal concave surface of the liner.

4. A liner according to claim 2, wherein the axis of the liner is an axis substantially perpendicular to the center axis of the internal concave surface of the liner.

5. A liner according to claim 2, wherein the axis of the liner is an axis defined by the external surface of the liner.

6. A liner according to claim 1, wherein one femoral component is employed to define said sculpted surface.

7. A liner according to claim 1, wherein a plurality of femoral components are employed to define said sculpted surface.

8 A liner according to claim 7, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, an angle determined using a group of impingement angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

9. A liner according to claim 7, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope, determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

10. A liner according to claim 1 where, in cross section, at least part of the sculpted surface is a chamfer.

11. A liner according to claim 1 where, in cross section, at least part of the sculpted surface is a curve.

12. A liner according to claim 11, wherein the radius of curvature and center of curvature of the curve varies relative to the structure of the liner in order to optimize range of motion of a femoral component whose head is adapted to be received in the internal concave surface of the liner.

13. A liner according to claim 11, wherein the curve is convex.

14. A liner according to claim 11, wherein the curve is concave.

15. A liner according to claim 1, wherein the sculpted surface varies around the rim of the liner and is symmetric about a plane.

16. A liner according to claim 1, wherein the external surface of the liner is adapted to be received directly into the acetabulum of a patient.

17. A liner according to claim 16, wherein the external surface of the liner is adapted to be secured into the acetabulum of a patient with bone cement.

18. A liner according to claim 1, wherein the external surface of the liner is adapted to be received within an acetabular shell, and the acetabular shell is adapted to be received in the acetabulum of a patient.

19. A liner according to claim 1 wherein the distance across the opening of the internal concave surface is from about 22mm to about 36mm.

20. A liner according to claim 1 wherein the external surface of the liner is adapted to be received in an acetabular shell with an external diameter of about 40mm to about 80mm.

21. A liner according to claim 1 further including a locking surface for securing the liner in an acetabular shell.

22. A liner according to claim 21, wherein the locking surface comprises a serrated edge.

23. A liner according to claim 1 further including a shoulder on said liner.

24. A liner according to claim 1, wherein the center of the internal concave surface is offset from the center of a surface in which the liner is adapted to be received.

25. A liner according to claim 24, wherein the center of the internal concave surface is shifted laterally by up to about 10 mm.

26. A liner according to claim 24, wherein the center of the internal concave surface is shifted laterally by about 4 mm.

27. A liner according to claim 24, wherein the center of the internal concave surface is shifted medially by up to about 8 mm.

28. A liner according to claim 1, wherein the opening of the internal concave surface is anteverted.

29. A liner according to claim 28, wherein the center axis of the internal concave surface of the liner is anteverted up to about 45 degrees relative to the central axis of a surface in which the liner is adapted to be received.

30. A liner according to claim 28, wherein the center axis of the internal concave surface of the liner is anteverted about 20 degrees relative to the central axis of a surface in which the liner is adapted to be received.

31. A liner according to claim 1, where the center axis of the internal concave surface of the liner is oriented up to about 45 degrees relative to the central axis of a surface in which the liner is adapted to be received.

32. A liner according to claim 1, where the center axis of the internal concave surface of the liner is oriented about 20 degrees relative to the central axis of a surface in which the liner is adapted to be received.

33. A liner according to claim 1, wherein the liner is a constrained liner wherein the internal concave surface of the liner provides greater than 180° of coverage of the head of a femoral component adapted to be received in the internal concave surface of the liner.

34. A liner according to claim 1, wherein the liner further comprises a recessed radial segment which dips below 180° of coverage of the head of a femoral component adapted to be received in the internal concave surface of the liner.

35. A liner according to claim 34, wherein the sculpted surface of the rim of the recessed radial segment varies

(a) in a manner corresponding to the cross-sectional shape of at least one femoral component in an impingement condition with the liner, and

(b) based at least in part on the impingement angle,

at each of a plurality of radial locations along the radial segment,

of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim of said radial segment,

said impingement angle measured relative to a reference line defined by structure of the liner.

36. A liner according to claim 1, wherein the internal concave surface of the liner provides less than 180° of coverage of the head of a femoral component adapted to be received in the internal concave surface of the liner.

37. A liner according to claim 1, further comprising a surface located between the surface of the internal diameter in which the head of the femoral component articulates and the rim surface, which serves to reduce dislocation.

38. A liner according to claim 1, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by a computer simulation of a liner and a femoral component, wherein the computer simulates rotation of the femoral component within the liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determines the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

39. A liner according to claim 1, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations

around the rim of the liner, is specified by manually rotating the femoral component within a liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determining the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

40. A liner according to claim 1, wherein the internal concave surface is an internal diameter.

41. A liner according to claim 1, wherein the internal concave surface is generally hemispherical.

42. A liner according to claim 1, wherein the internal concave surface is generally oval.

43. A liner according to claim 1, wherein the internal concave surface is generally elliptical.

44. A liner according to claim 1, wherein the internal concave surface is generally oblong.

45. An acetabular liner for hip replacement comprising:

(a) an internal diameter adapted to receive the head of a femoral component;

(b) an external surface positioned on an opposing side of the liner from the internal diameter;

(c) a sculpted surface generally defining at least part of a rim of the liner, said surface located between the internal diameter and an external surface of the liner; and

(d) wherein the sculpted surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal diameter of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the shape of the sculpted surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component that is in an impingement condition with the liner.

46. A liner according to claim 45, wherein the reference line is an axis of the liner.

47. A liner according to claim 46, wherein the axis of the liner is the center axis of the internal diameter of the liner.

48. A liner according to claim 46, wherein an axis of the liner is the axis substantially perpendicular to the center axis of the internal diameter of the liner.

49. A liner according to claim 46, wherein the axis of the liner is an axis defined by the external surface of the liner.

50. A liner according to claim 45, wherein one femoral component is employed to define said sculpted surface.

51. A liner according to claim 45, wherein a plurality of femoral components are employed to define said sculpted surface.

52. A liner according to claim 51, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, an angle determined using a group of impingement angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal diameter of the liner.

53. A liner according to claim 51, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal diameter of the liner.

54. A liner according to claim 45 where, in cross section, at least part of the sculpted surface is a chamfer.

55. A liner according to claim 45 where, in cross section, at least part of the sculpted surface is a curve.

56. A liner according to claim 55, wherein the radius of curvature and center of curvature of the curve varies relative to the structure of the liner in order to optimize range of motion of a femoral component whose head is adapted to be received in the internal diameter of the liner.

57. A liner according to claim 55, wherein the curve is convex.

58. A liner according to claim 55, wherein the curve is concave.

59. A liner according to claim 45, wherein the sculpted surface varies around the rim of the liner and is symmetric about a plane.

60. A liner according to claim 45, wherein the external surface of the liner is adapted to be received directly into the acetabulum of a patient.

61. A liner according to claim 60, wherein the external surface of the liner is adapted to be secured into the acetabulum of a patient with bone cement.

62. A liner according to claim 45, wherein the external surface of the liner is adapted to be received within an acetabular shell, and the acetabular shell is adapted to be received in the acetabulum of a patient.

63. A liner according to claim 45 wherein the internal diameter is from about 22mm to about 36mm.

64. A liner according to claim 45 wherein the external surface of the liner is adapted to be received in an acetabular shell with an external diameter of about 40mm to about 80mm.

65. A liner according to claim 45 further including a locking surface for securing the liner in an acetabular shell.

66. A liner according to claim 65, wherein the locking surface comprises a serrated edge.

67. A liner according to claim 45 further including a shoulder on said liner.

68. A liner according to claim 45, wherein the center of the internal diameter is offset from the center of a surface in which the liner is adapted to be received.

69. A liner according to claim 68, wherein the center of the internal diameter is shifted laterally by up to about 10 mm.

70. A liner according to claim 68, wherein the center of the internal diameter is shifted laterally by about 4 mm.

71. A liner according to claim 68, wherein the center of the internal diameter is shifted medially by up to about 8 mm.

72. A liner according to claim 45, wherein the opening of the internal diameter is anteverted.

73. A liner according to claim 72, wherein the center axis of the internal diameter of the liner is anteverted up to about 45 degrees relative to the central axis of a surface in which the liner is adapted to be received.

74. A liner according to claim 72, wherein the center axis of the internal diameter of the liner is anteverted about 20 degrees relative to the central axis of a surface in which the liner is adapted to be received.

75. A liner according to claim 45, where the center axis of the internal diameter of the liner is oriented up to about 45 degrees relative to the central axis of a surface in which the liner is adapted to be received.

76. A liner according to claim 45, where the center axis of the internal diameter of the liner is oriented about 20 degrees relative to the central axis of a surface in which the liner is adapted to be received.

77. A liner according to claim 45, wherein the liner is a constrained liner wherein the internal diameter of the liner provides greater than 180° of coverage of the head of a femoral component adapted to be received in the internal diameter of the liner.

78. A liner according to claim 45, wherein the liner further comprises a recessed radial segment which dips below 180° of coverage of the head of a femoral component adapted to be received in the internal diameter of the liner.

79. A liner according to claim 78, wherein the sculpted surface of the rim of the recessed radial segment varies

(a) in a manner corresponding to the cross-sectional shape of at least one femoral component in an impingement condition with the liner, and

(b) based at least in part on the impingement angle,

at each of a plurality of radial locations along the radial segment,

of at least one femoral component whose head is adapted to be received in the internal diameter of the liner and which is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim of said radial segment,

said impingement angle measured relative to a reference line defined by structure of the liner.

80. A liner according to claim 45, wherein the internal diameter of the liner provides less than 180° of coverage of the head of a femoral component adapted to be received in the internal diameter of the liner.

81. A liner according to claim 45, further comprising a cylindrical wall surface located between the surface of the internal diameter in which the head of the femoral component articulates and the rim surface, which serves to reduce dislocation.

82. A liner according to claim 45, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by a computer simulation of a liner and a femoral component, wherein the computer simulates rotation of the femoral component within the liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determines the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

83. A liner according to claim 48, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by manually rotating the femoral component within a liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determining the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

84. An acetabular liner for hip replacement comprising:

(a) an internal diameter adapted to receive the head of a femoral component, wherein the internal diameter is from about 22mm to about 32mm and wherein the opening of the internal diameter is anteverted;

(b) an external surface adapted to be received in the internal diameter of an acetabular shell;

(c) a chamfered surface generally defining at least part of a rim of the liner, said surface located between the internal diameter and an external surface of the liner; and

(d) wherein the chamfer angle of the chamfered surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal diameter of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the chamfered surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component in an impingement condition with the liner.

85. The liner according to claim 84, where the center axis of the internal diameter of the liner is anteverted up to about 45 degrees relative to the central axis of the shell.

86. The liner according to claim 84, where the center axis of the internal diameter of the liner is anteverted about 20 degrees relative to the central axis of the shell.

87. The liner according to claim 84, where the internal diameter is about 28 mm.

88. A liner according to claim 84, wherein the reference line is an axis of the liner.

89. A liner according to claim 88, wherein the axis of the liner is the center axis of the internal diameter of the liner.

90. A liner according to claim 88, wherein the axis of the liner is an axis substantially perpendicular to the center axis of the internal diameter of the liner.

91. A liner according to claim 84, wherein a plurality of femoral components are employed to define said sculpted surface.

92. A liner according to claim 91, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, an angle determined using a group of impingement angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal diameter of the liner.

93. A liner according to claim 91, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal diameter of the liner.

94. A liner according to claim 84, wherein the chamfer angle varies around the rim of the liner and is symmetric about a plane.

95. A liner according to claim 84 wherein the external surface of the liner is adapted to be received in an acetabular shell with an external diameter of about 40mm to about 80mm.

96. A liner according to claim 84 further including a locking surface for securing the liner in an acetabular shell.

97. A liner according to claim 96, wherein the locking surface comprises a serrated edge.

98. A liner according to claim 84, wherein the center of the internal diameter is shifted laterally by up to about 10 mm.

99. A liner according to claim 84, wherein the center of the internal diameter is shifted laterally by about 4 mm.

100. A liner according to claim 84, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by a computer simulation of a liner and a femoral component, wherein the computer simulates rotation of the femoral component within the liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determines the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

101. A liner according to claim 84, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by manually rotating the femoral component within a liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determining the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

102. A prosthetic device comprising:

(a) an acetabular shell comprising an internal concave surface adapted to receive a liner and an external surface adapted to be received in an acetabulum; and

(b) an acetabular liner having:

an internal concave surface adapted to receive the head of a femoral component;

an external surface positioned on an opposing side of the liner from the internal concave surface and adapted to be received in the internal concave surface of the acetabular shell;

a sculpted surface generally defining at least part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner; and

wherein the sculpted surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the shape of the sculpted surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component that is in an impingement condition with the liner.

103. A device according to claim 102, wherein the reference line of the liner is an axis of the liner.

104. A device according to claim 103, wherein the axis of the liner is the center axis of the internal concave surface of the liner.

105. A device according to claim 103, wherein the axis of the liner is an axis substantially perpendicular to the center axis of the internal concave surface of the liner.

106. A device according to claim 103, wherein the axis of the liner is an axis defined by the external surface of the liner.

107. A device according to claim 102, wherein one femoral component is employed to define said sculpted surface of the liner.

108. A device according to claim 102, wherein a plurality of femoral components are employed to define said sculpted surface of the liner.

109. A device according to claim 108, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, an angle determined using a group of impingement angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

110. A device according to claim 108, wherein the sculpted surface is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

111. A device according to claim 102 where, in cross section, at least part of the sculpted surface is a chamfer.

112. A device according to claim 102 where, in cross section, at least part of the sculpted surface is a curve.

113. A device according to claim 112, wherein the radius of curvature and center of curvature of the curve varies relative to the structure of the liner in order to optimize range of motion of a femoral component whose head is adapted to be received in the internal concave surface of the liner.

114. A device according to claim 112, wherein the curve is convex.

115. A device according to claim 112, wherein the curve is concave.

116. A device according to claim 102, wherein the sculpted surface varies around the rim of the liner and is symmetric about a plane.

117. A device according to claim 102 wherein the distance across the opening of the internal concave surface is from about 22mm to about 36mm.

118. A device according to claim 102 wherein the external surface of the liner is adapted to be received in an acetabular shell with an external diameter of about 40mm to about 80mm.

119. A device according to claim 102 wherein the liner further includes a locking surface for securing the liner in the acetabular shell.

120. A device according to claim 119, wherein the locking surface comprises a serrated edge.

121. A device according to claim 102 further including a shoulder on said liner.

122. A device according to claim 102, wherein the center of the liner internal concave surface is offset from the center of the shell.

123. A device according to claim 122, wherein the center of the liner internal concave surface is shifted laterally by up to about 10 mm.

124. A device according to claim 122, wherein the center of the liner internal concave surface is shifted laterally by about 4 mm.

125. A device according to claim 122, wherein the center of the liner internal concave surface is shifted medially by up to about 8 mm.

126. A device according to claim 102, wherein the opening of the liner internal concave surface is anteverted.

127. A device according to claim 126, wherein the center axis of the liner internal concave surface of the liner is anteverted up to about 45 degrees relative to the central axis of the shell.

128. A device according to claim 126, wherein the center axis of the liner internal concave surface of the liner is anteverted about 20 degrees relative to the central axis of the shell.

129. A device according to claim 102, where the center axis of the liner internal concave surface of the liner is oriented up to about 45 degrees relative to the central axis of the shell.

130. A device according to claim 102, where the center axis of the liner internal concave surface of the liner is oriented about 20 degrees relative to the central axis of the shell.

131. A device according to claim 102, wherein the liner is a constrained liner wherein the internal concave surface of the liner provides greater than 180° of coverage of the head of a femoral component adapted to be received in the internal concave surface of the liner.

132. A device according to claim 102, wherein the liner further comprises a recessed radial segment which dips below 180° of coverage of the head of a femoral component adapted to be received in the liner internal concave surface of the liner.

133. A device according to claim 132, wherein the sculpted surface of the rim of the recessed radial segment varies

(a) in a manner corresponding to the cross-sectional shape of at least one femoral component in an impingement condition with the liner, and

(b) based at least in part on the impingement angle,

at each of a plurality of radial locations along the radial segment,

of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim of said radial segment

said impingement angle measured relative to a reference line defined by structure of the liner.

134. A device according to claim 102, wherein the internal concave surface of the liner provides less than 180° of coverage of the head of a femoral component adapted to be received in the internal concave surface of the liner.

135. A device according to claim 102, further comprising a surface located between the surface of the internal diameter in which the head of the femoral component articulates and the rim surface, which serves to reduce dislocation.

136. A device according to claim 102, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by a computer simulation of a liner and a femoral component, wherein the computer simulates rotation of the femoral component within the liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determines the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

137. A device according to claim 102, wherein the impingement angle and cross-sectional shape of the portion of a femoral component that is in an impingement condition with the liner, at each of a plurality of radial locations around the rim of the liner, is specified by manually rotating the femoral component within a liner to define a radial location on the rim of the liner where the femoral component impinges on the rim, and determining the impingement angle and cross-sectional shape of the femoral component on the rim at that radial location.

138. A device according to claim 102, wherein the liner internal concave surface is an internal diameter.

139. A device according to claim 102, wherein the liner internal concave surface is generally hemispherical.

140. A device according to claim 102, wherein the liner internal concave surface is generally oval.

141. A device according to claim 102, wherein the liner internal concave surface is generally elliptical.

142. A device according to claim 102, wherein the liner internal concave surface is generally oblong.

143. A device according to claim 102, further comprising a femoral component comprising a head, neck and stem, wherein the head is adapted to articulate within the internal concave surface of the liner.

144. A method of making an acetabular liner with a variable rim surface geometry comprising:

(a) providing an acetabular liner comprising

an internal concave surface adapted to receive the head of a femoral component,

an external surface positioned on an opposing side of the liner from the internal concave surface, and

a surface generally defining at least a part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner;

(b) rotating a femoral component in the acetabular liner to define a radial location on the rim of the liner where the femoral component impinges on the rim and noting that radial location;

(c) defining the impingement angle of the femoral component on the rim at this radial location and noting that impingement angle;

(d) defining the location and desired shape of a cross-sectional rim segment at that impingement angle and radial location, based at least in part on the cross-sectional shape of the portion of the femoral component that is in an impingement condition with the liner, and noting that location and desired shape of the cross sectional rim segment;

(e) rotating the femoral component in the acetabular liner to define a separate radial location on the rim where the femoral component impinges on the rim and noting that radial location;

(f) repeating (c)-(e) as desired; and

(g) forming the liner with a variable geometry rim surface using the data obtained in steps (b)-(f), whereby the shape of the liner rim varies at a plurality of radial locations in a manner corresponding to the cross-sectional shape of the portion of the femoral component that is in an impingement condition with the liner.

145. The method of claim 144 further comprising forming the liner with a variable geometry rim surface by extrapolating based on the data obtained in steps (b)-(f).

146. The method of claim 144 further comprising forming the liner with a variable geometry rim surface by interpolating based on the data obtained in steps (b)-(f).

147. The method of claim 144 wherein the rotation of the femoral component within the internal concave surface of the liner is relative to an anatomically relevant axis.

148. The method of claim 147, wherein the anatomically relevant axis is an axis running approximately through the center of rotation of a femoral component articulating within the internal concave surface of the liner, said axis oriented in a plane substantially parallel to a plane of the body selected from the group consisting of the transverse, coronal, and saggital planes of the body.

149. The method of claim 144 wherein step (f) further comprises repeating steps (c) through (e) in desired angular increments.

150. The method of claim 149 wherein steps (c) through (e) are repeated in increments of about fifteen degrees.

151. The method of claim 144 wherein one femoral component is employed to define said rim surface geometry.

152. The method of claim 144 wherein a plurality of femoral components are employed to define said rim surface geometry.

153. The method of claim 152, wherein the rim surface geometry is defined at least in part by, at each of a plurality of locations around the rim, an angle determined using a group of impingement angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

154. The method of claim 152, wherein the rim surface geometry is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are adapted to be received in the internal concave surface of the liner.

155. A method of making an acetabular liner with a variable geometry rim surface comprising:

(a) in a computer containing at least a processing functionality, rendering functionality, and storage functionality,

simulating a femoral component and an acetabular component,

the acetabular component comprising a liner having an internal concave surface adapted to receive the head of a femoral component,

an external surface positioned on an opposing side of the liner from the internal concave surface, and

a surface generally defining at least a part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner;

(b) in the computer, rotating a femoral component in the acetabular liner to define a radial location on the rim of the liner where the femoral component impinges on the rim and noting that radial location;

(c) defining the impingement angle of the femoral component on the rim at this radial location and noting that impingement angle;

(d) defining the location and desired shape of a cross-sectional rim segment at that impingement angle and radial location, based at least in part on the cross-sectional shape of the portion of the femoral component that is in an impingement condition with the liner, and noting that location and desired shape of the cross sectional rim segment;

(e) in the computer, rotating the femoral component in the acetabular liner to define a separate radial location on the rim where the femoral component impinges on the rim and noting that radial location;

(f) repeating (c)-(e) as desired; and

(g) forming the liner with a variable geometry rim surface using the data obtained in steps (b)-(f), whereby the shape of the liner rim varies at a plurality of radial locations in a manner corresponding to the cross-sectional shape of the portion of the femoral component that is in an impingement condition with the liner.

156. The method of claim 155 further comprising forming the liner with a variable geometry rim surface by extrapolating based on the data obtained in steps (b)-(f).

157. The method of claim 155 further comprising forming the liner with a variable geometry rim surface by interpolating based on the data obtained in steps (b)-(f).

158. The method of claim 156 wherein the computer extrapolates based on the data obtained in steps (b)-(f).

159. The method of claim 157 wherein the computer interpolates based on the data obtained in steps (b)-(f).

160. The method of claim 155, wherein steps (b)-(f) are performed with a computer.

161. The method of claim 155 wherein, based on the data obtained in steps (b)-(f), the computer produces a set of specifications for forming a liner with a variable geometry rim surface.

162. The method of claim 155 wherein the rotation of the femoral component within the internal concave surface of the liner is relative to an anatomically relevant axis.

163. The method of claim 162, wherein the anatomically relevant axis is an axis running approximately through the center of rotation of a femoral component articulating within the internal concave surface of the liner, said axis oriented in a plane substantially parallel to a plane of the body selected from the group consisting of the transverse, coronal, and saggital planes of the body.

164. The method of claim 155 wherein step (f) further comprises repeating steps (c) through (e) in desired angular increments.

165. The method of claim 164 wherein steps (c) through (e) are repeated in increments of about fifteen degrees.

166. The method of claim 155 wherein one femoral component is employed to define said rim surface geometry.

167. The method of claim 155 wherein a plurality of femoral components are employed to define said rim surface geometry.

168. The method of claim 167, wherein the rim surface geometry is defined at least in part by, at each of a plurality of locations around the rim, an impingement angle determined using a group of angles corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are received in the internal concave surface of the liner.

169. The method of claim 167, wherein the rim surface geometry is defined at least in part by, at each of a plurality of locations around the rim, a cross-sectional envelope determined using a group of cross-sectional shapes corresponding to a plurality of femoral components in an impingement condition with the liner whose heads are received in the internal concave surface of the liner.

170. A method of replacing a hip joint in a patient comprising

(a) providing an acetabular liner having:

an internal concave surface adapted to receive the head of a femoral component;

an external surface positioned on an opposing side of the liner from the internal concave surface and adapted to be received directly in the acetabulum of a patient;

a sculpted surface generally defining at least part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner; and

wherein the sculpted surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the shape of the sculpted surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component that is in an impingement condition with the liner.

(b) surgically implanting and securing the liner within the acetabulum of a patient;

(c) providing a femoral component, comprising a head, neck and a stem, wherein the head is adapted to articulate within the internal concave surface of the liner;

(d) surgically implanting the stem of the femoral component into the femur of a patient; and

(e) installing the head of the femoral component into the internal concave surface of the liner.

171. A method according to claim 170, wherein the liner is secured within the acetabulum with bone cement.

172. A method according to claim 170, wherein the liner is secured within the acetabulum with an integral bone in-growth surface.

173. A method according to claim 172, wherein the bone in-growth surface comprises a textured matrix incorporated into the material forming the external surface of the liner.

174. A method according to claim 173, wherein the textured matrix comprises a porous material.

175. A method according to 172, wherein the integral bone in-growth surface comprises a roughened surface comprising at least part of the external surface of the liner.

176. A method according to claim 170, wherein the liner is mechanically secured within the acetabulum of a patient.

177. A method according to claim 176, wherein the liner is mechanically secured in within the acetabulum of a patient with screw threads integral to the external surface of the liner.

178. A method according to claim 176, wherein the liner is mechanically secured within the acetabulum with bone screws.

179. A method of replacing a hip joint in a patient comprising:

(a) providing an acetabular liner having:

an internal concave surface adapted to receive the head of a femoral component;

an external surface positioned on an opposing side of the liner from the internal concave surface and adapted to be received in the internal concave surface of an acetabular shell;

a sculpted surface generally defining at least part of a rim of the liner, said surface located between the internal concave surface and an external surface of the liner; and

wherein the sculpted surface is defined at least in part by, given a desired angular position of the liner in a patient:

the impingement angle, at each of a plurality of radial locations around the rim, of at least one femoral component whose head is adapted to be received in the internal concave surface of the liner and which femoral component is disposed to permit the desired limit of range of motion at a corresponding radial location on said rim;

said impingement angle measured relative to a reference line defined by structure of the liner; and

wherein the shape of the sculpted surface varies around the rim of the liner in a manner corresponding to the cross-sectional shape of the portion of the at least one femoral component that is in an impingement condition with the liner.

(b) providing an acetabular shell comprising an internal concave surface adapted to receive the liner and an external surface adapted to be received in an acetabulum;

(c) surgically implanting and securing the shell in the acetabulum of a patient;

(d) securing the liner in the internal concave surface of the shell;

(e) providing a femoral component, comprising a head, neck and a stem, wherein the head is adapted to articulate within the internal concave surface of the liner;

(f) surgically implanting the stem of the femoral component into the femur of a patient; and

(g) installing the head of the femoral component into the internal concave surface of the liner.

180. A method according to claim 179, wherein the liner is secured in the internal concave surface of the shell with a locking surface.

181. A method according to claim 180, wherein the locking surface comprises a serrated edge.